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Swine Disease Reporting: Report #21

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Swine Disease Reporting System
Report 21 (November 5th , 2019)

What is the Swine Disease Reporting System (SDRS)?

SDRS includes multiple projects that aggregates data from participating veterinary diagnostic laboratories (VDLs) in the United States of America, and reports the major findings to the swine industry. Our goal is to share information on endemic and emerging diseases affecting the swine population in the USA, assisting veterinarians and producers to make informed decisions on disease prevention, detection and management.

After aggregating information from participating VDLs and summarizing the data, we ask the input of our advisory group, which consists of veterinarians and producers across the USA swine industry. The intent is to provide interpretation of the data observed, and summarize the implications to the industry. Major findings are also discussed in monthly podcasts. All SDRS programs are available at www.fieldepi.org/SDRS:

Swine Health Information Center (SHIC)-funded Domestic Disease Surveillance Program: collaborative project among multiple VDLs, with the goal to aggregate swine diagnostic data and report in an intuitive formats (web dashboards and monthly PDF report), describing *dynamics of pathogen detection by PCR-based assays over time, specimen, age group, and geographical area*. Data is from the Iowa State University VDL, South Dakota State University ADRDL, University of Minnesota VDL and Kansas State University VDL.

Collaborators*:*

Iowa State University: Giovani Trevisan*, Edison Magalhães, Leticia Linhares, Bret Crim, Poonam Dubey, Kent Schwartz, Eric Burrough, Phillip Gauger, Rodger Main, Daniel Linhares**.

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South Dakota State University: Jon Greseth, Travis Clement, Jane C. Hennings.

Disease Diagnosis System: This is a pilot program with the ISU-VDL, which consists of reporting *disease detection* (not just pathogen detection by PCR), based on diagnostic codes assigned by veterinary diagnosticians.

FLUture: This is a project that aggregates *Influenza A virus (IAV) diagnostic data* from the ISU-VDL, including test results, metadata, and sequences.

PRRS virus RFLP report: Benchmarks patterns of PRRSV RFLP type detected at the ISU-VDL over time, USA state, specimen, and age group.

Audio and video reports: Key findings are summarized monthly in a conversation between investigators, and available in form of an 'audio report', and "video report" though YouTube.

Advisory Council:

The advisory group reviews the data to discuss it and provide their comments to try to give the data some context and thoughts about its interpretation: Clayton Johnson, Emily Byers, Mark Schwartz, Paul Sundberg, Paul Yeske, Rebecca Robbins, Tara Donovan, Deborah Murray, Scott Dee, Melissa Hensch.

This report is an abbreviated version of the content available online at www.fieldepi.org/SDRS.

Topic 1 – Detection of PRRSV RNA over time by RT-qPCR.

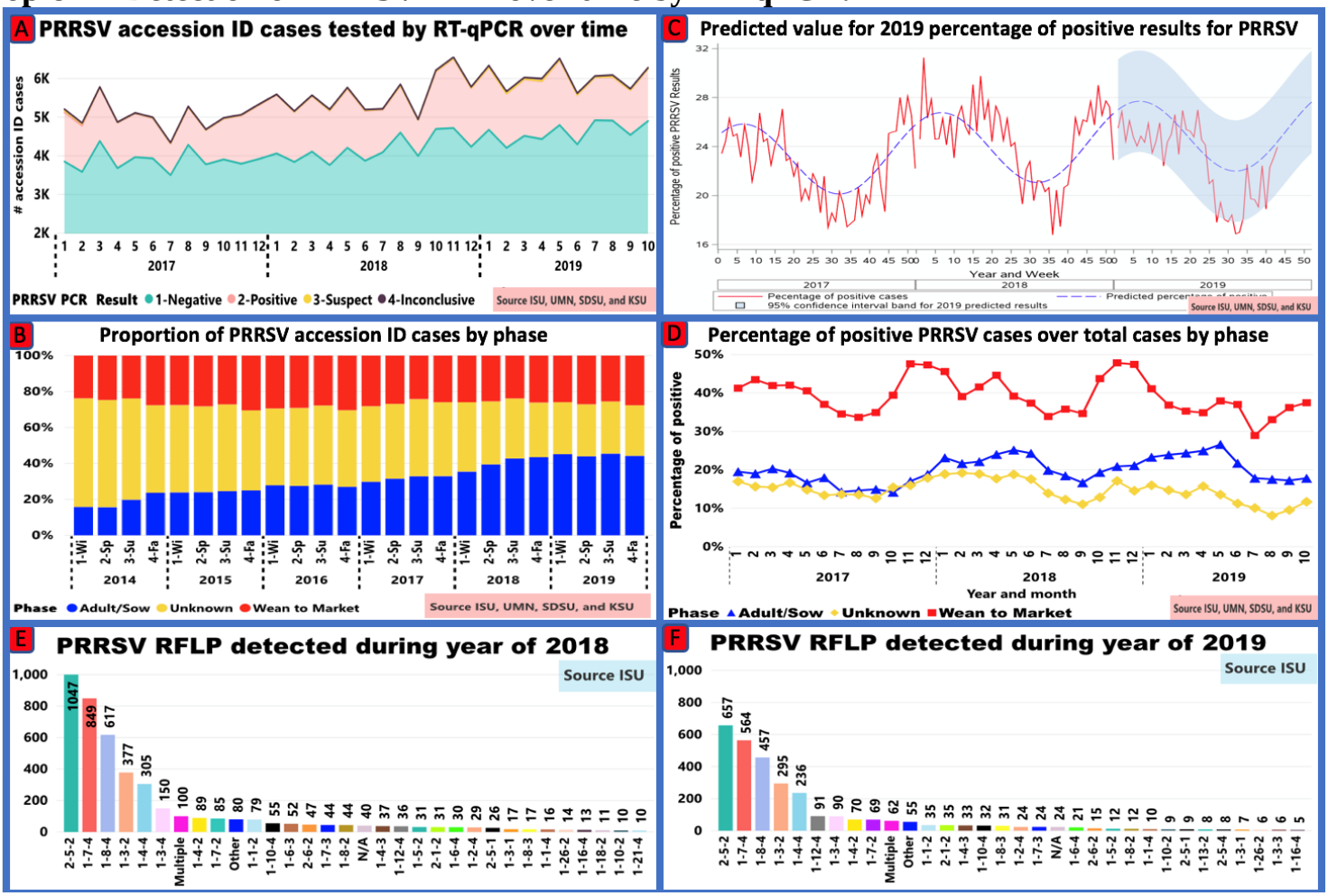

Figure 1. A: Results of PRRS RT-qPCR cases over time. **B**: Proportion of accession ID cases tested for PRRSV by age group per year and season. **C**: expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results based on weekly data observed in the previous 3 years. **D**: percentage of PRRS PCR-positive results, by age category over time. Wean to market corresponds to nursery and grow-finish. Adult/Sow correspond to Adult, boar stud, breeding herd, replacement, and suckling piglets. Unknown corresponds to not informed site type or farm category. **E**: RFLP type detected during year of 2019. **F**: RFLP type detected during year of 2018. RFLPs indicated as N/A represents not detected, or European PRRSV type.

SDRS Advisory Council highlights:

- The overall percentage of positive in October was at 21.56%. It was 20.21% in September, with increased detection in all age categories;
  - The percentage of PCR-positive cases from wean-to-market increased for 3 consecutive months;
  - The percentage of PCR-positive cases from adult/sow farm increased for 4 consecutive weeks;
- When compared to the same period of 2018 (January to September), the RFLP patterns with increased number of case detections during 2019 were: 75 cases for the RFLP 1-12-4 (12 vs. 87), 62 cases for 1-3-2 (214 vs. 272), 22 cases for 1-4-4 (198 vs. 220), 18 cases for 1-8-3 (10 vs. 28), 13 cases for 2-1-2 (20 vs. 33), 12 cases for 1-7-2 (51 vs. 63), and 11 cases for 1-4-3 (20 vs. 31);
- The RFLP patterns 1-12-4, 1-4-4, 1-8-3, 1-7-2, and 1-4-3 were mainly classified as wild-type strains based on the cut off of 99% similarity with vaccine reference sequences used at the ISU-VDL.
- The Advisory Council pointed out that the increased detection of PRRSV is according to the expected for this period of the year and the RFLP patterns with increased detection are not associated with higher severity of the disease when compared with RFLP pattern 1-7-4 and or 1-8-4.

Topic 2 – Detection of enteric coronaviruses by RT-qPCR

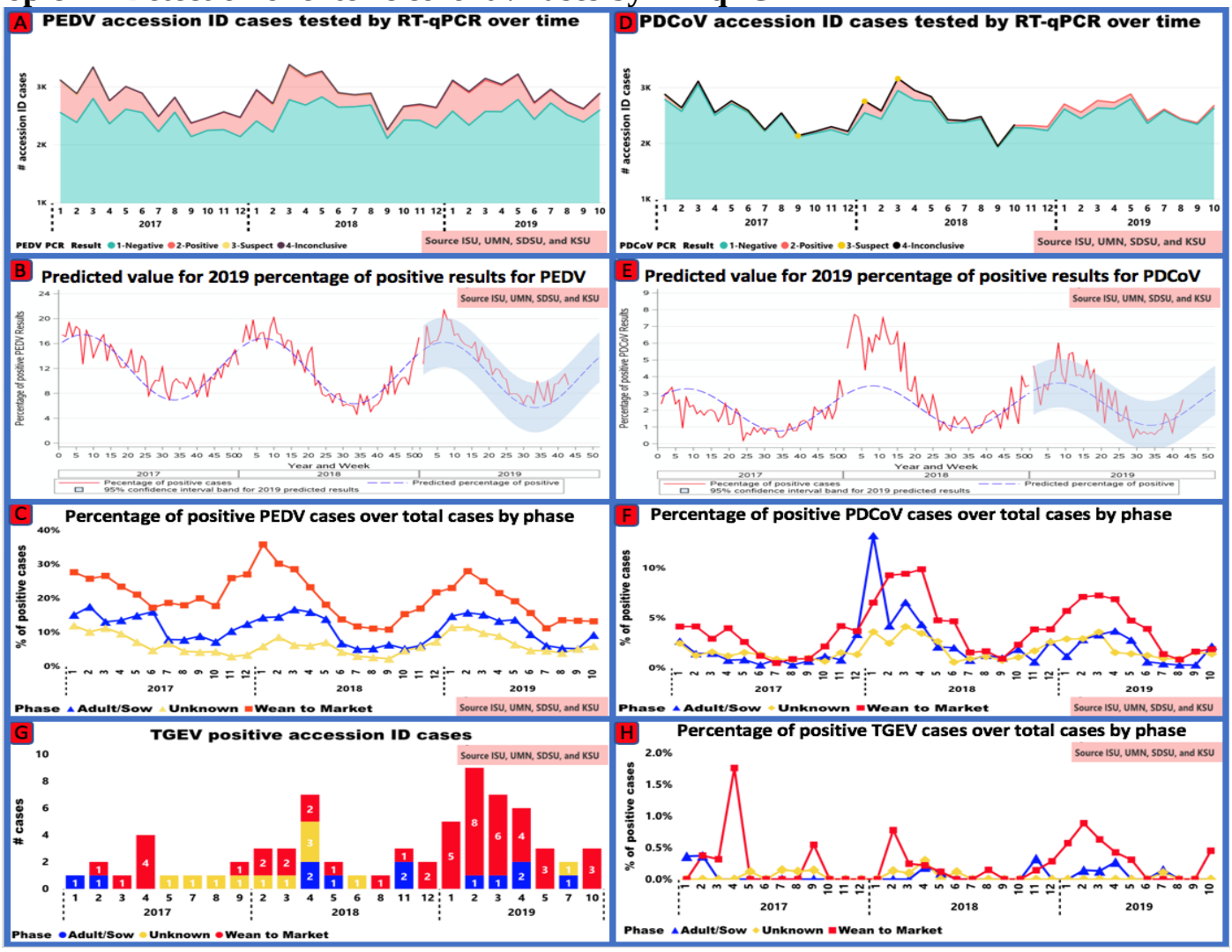

Figure 2. A: results of PEDV RT-qPCR cases over time. **B**: expected percentage of positive results for PEDV by RT-qPCR and 95% confidence interval for 2019 predicted value. **C:** percentage of PEDV PCR-positive results, by category over time. **D**: results of PDCoV RT-qPCR cases over time. **E**: expected percentage of positive results for PDCoV by RT-qPCR and 95% confidence interval for 2019 predicted value, based on weekly data observed in the previous 3 years. **F:** percentage of PDCoV PCR-positive results, by age category over time. **G**: number of PCR-positive accession ID results of TGEV by age category. **H**: percentage of PCR-positive results for TGEV by age category. Each color represents one distinct age category.

SDRS Advisory Council highlights:

- PEDV and PDCoV RNA detection in October increased as expected, mostly driven by adult/sow farm;
- Percentage of PEDV detection in October in adult/sow farm was 9.20%, which represents an increase of 4.04 percentage points from September (5.16%);
- The level of detection of PDCoV RNA during October in adult/sow farm was 2.18%, which represents an increase of 1.89% from September when it was 0.29%;
- After 2 months with no detection of TGEV RNA, there were 3 positive cases for TGEV over a total of 2,586 cases tested in October;
- The increased detection of PEDV and PDCoV RNA in the age category adult/sow farm is occurring earlier this year compared to previous years, and may be related to monitoring planned gilt exposure.

Topic 3 – Detection of MHP by PCR

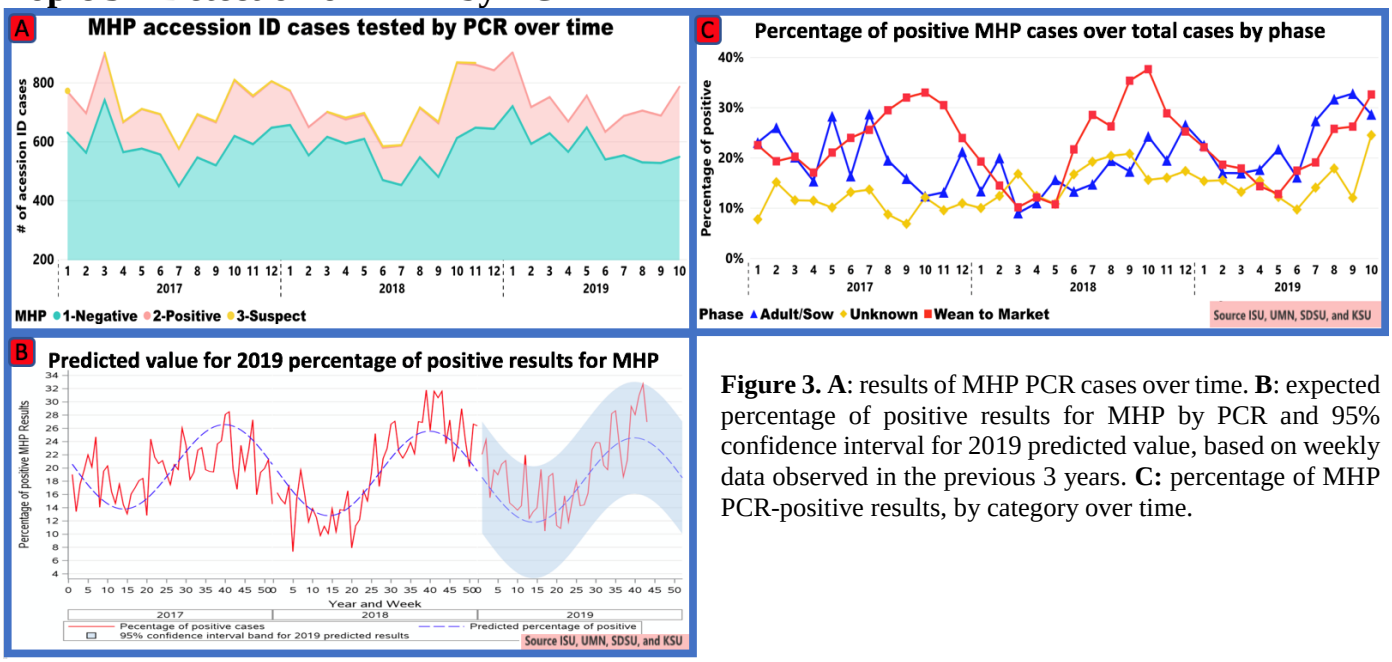

Figure 3. A: results of MHP PCR cases over time. **B**: expected percentage of positive results for MHP by PCR and 95% confidence interval for 2019 predicted value, based on weekly data observed in the previous 3 years. **C:** percentage of MHP PCR-positive results, by category over time.

SDRS Advisory Council highlights:

- There was a slight signal for increased detection of *Mycoplasma hyopneumoniae* above the expected for this period of the year during week 42;
- The level of detection of *Mycoplasma hyopneumoniae* during October for the age category wean-to-market was at 32.64%, which represents an increase of 6.6% from September when it was 26.04%. The average number of weekly cases tested increased from 86 to 117;
- Two different scenarios have been pointed out by the advisory council:
    - Herds under elimination programs for *M. hyopneumoniae* likely implemented improved bio-management techniques, and intensified diagnostic testing to closely monitor Mh activity;
    - The increased number of cases tested with increased detection of *M. hyopneumoniae* is also associated with higher detection and activity of the agent in herds not enrolled in Mh elimination programs.

Topic 4 – Disease diagnosis at ISU-VDL

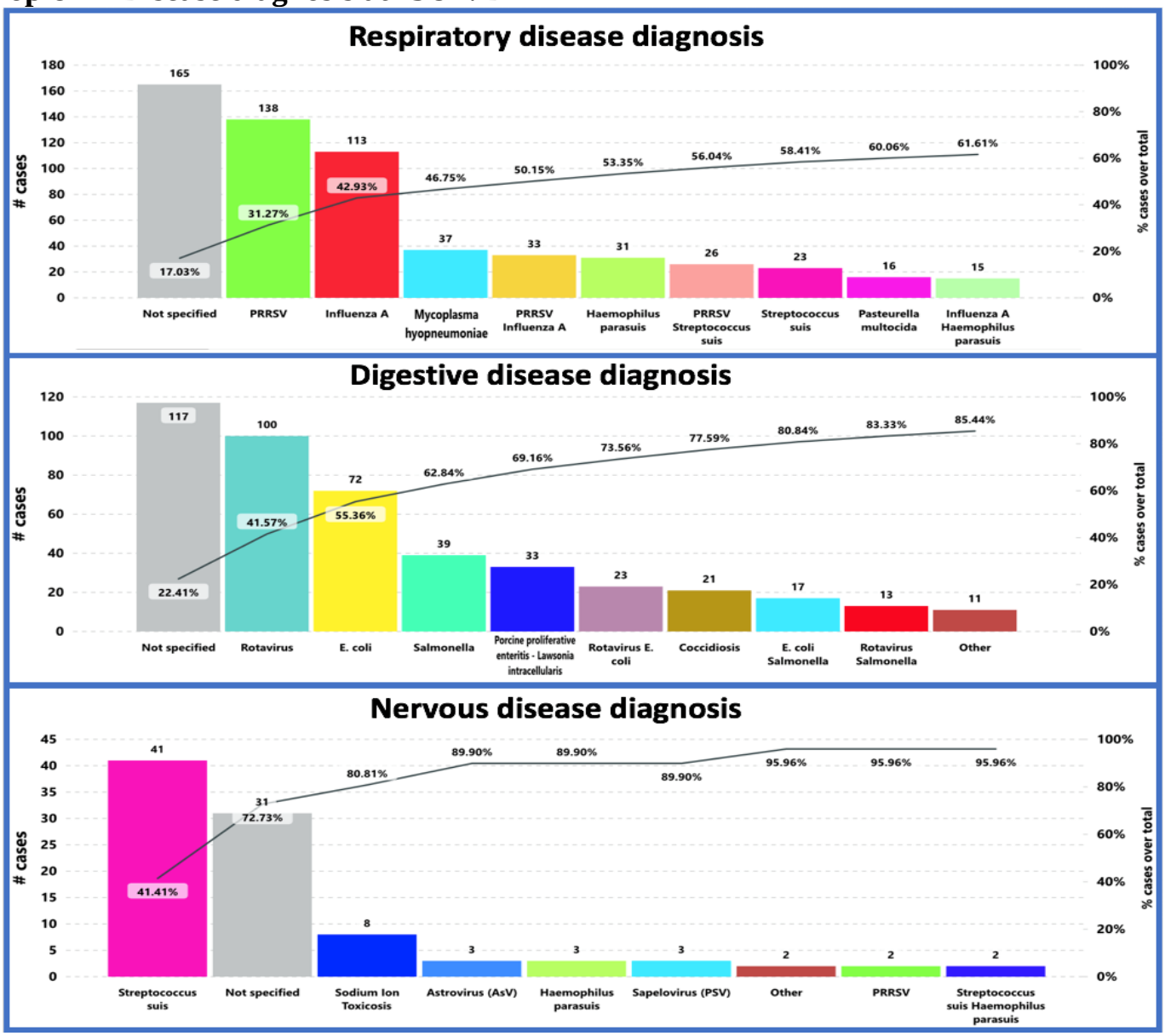

Figure 5. Most frequent disease diagnosis by physiologic system at ISU-VDL . Presented system is described in the title of the chart. Colors represent one agent and/or the combination of 2 or more agents. Only the physiologic systems with historic number of cases per season above 100 are presented in the report. Information for other systems can be accessed online at www.fieldepi.org/diagnosis

Note: Disease diagnosis takes one to two weeks to be performed. The graph and analysis contain data from September 1st to October 19th.

SDRS Advisory Council highlights:

- Among the cases submitted for diagnosis at ISU-VDL during September 1st to October 19th there was a signal for an increased number of cases diagnosed with the presence of the endemic respiratory agents Influenza virus A, and *M. hyopneumoniae;*
- The advisory council pointed out that the activity of Influenza virus A is occurring a little earlier this year when compared with previous years but it is not associated with more severity of the disease and may be a result of more monitoring to understand what is circulating in the herd;